CLAIMS:

WHAT IS CLAIMED IS:

1. In an apparatus having a first reflector defining an active concave surface and a second reflector defining an active surface facing the active concave surface, the active concave surface of the first reflector defining an optical axis, the improvement comprising at least one of:

defined by the first reflector, a first planar alignment surface that is perpendicular to the optical axis defined by the active concave surface and a first concave alignment surface defining an optical axis coincident with that defined by said active concave surface; and

defined by the second reflector, a second planar alignment surface that is perpendicular to an optical axis defined by the active surface of the second reflector and a second concave alignment surface that defines an optical axis that is coincident with that defined by said active surface of said second reflector.

2. The apparatus of claim 1 wherein both the first reflector defines said first planar and first concave alignment surfaces, and the second reflector defines said second planar and said second concave alignment surfaces.

3. The apparatus of claim 2 wherein each of said first and second concave alignment surfaces face the same direction.

4. The apparatus of claim 2 wherein the first concave alignment surface defines a parabola.

5. The apparatus of claim 4 wherein the second reflector is disposed between a vertex and a focus defined by said parabola.

6. The apparatus of claim 5 wherein a focus defined by the second concave alignment surface is co-incident with the focus defined by the parabola of the first concave alignment surface when said first and second reflectors are aligned in five degrees of freedom.

7. The apparatus of claim 6 in combination with a retro-reflector for optically positioning the second reflector relative to the first reflector.

8. The apparatus of claim 1 wherein the first reflector defines a first planar and first concave alignment surfaces, wherein at least a portion of one of said alignment surfaces lie outboard of the active concave surface.

9. The apparatus of claim 1 wherein at least one of: a first body attached to said first reflector defines at least one of said first planar and first concave alignment surfaces; and a second body attached to said second reflector defines at least one of said second planar and second concave alignment surfaces.

10. The apparatus of claim 1 in combination with an interferometer disposed such that an alignment beam, perpendicular to at least one of said first and second planar alignment surfaces, is aligned to reflect from the at least one of said first and second planar alignment surfaces.

11. The apparatus of claim 1 in combination with an interferometer positioned such that a performance check beam reflected from, in order, the active concave surface of the primary reflector, the active surface of the secondary reflector, at least one other reflector, the active surface of the secondary reflector, and the active concave surface of the primary reflector, is interfered with a reference beam at a reference flat of the interferometer.

12. The apparatus of claim 11 wherein the performance check beam may be used to simultaneously measure alignment at least in five degrees of freedom among the first and second reflectors.

13. In the apparatus of claim 1 further comprising a tertiary reflector defining an active tertiary concave surface, the improvement comprising at least one of:

defined by the first reflector, a first planar alignment surface that is perpendicular to an optical axis defined by the concave active surface and a first concave alignment surface defining an optical axis coincident with that defined by said active concave surface;

defined by the second reflector, a second planar alignment surface that is

perpendicular to an optical axis defined by the active surface of the second reflector and a second concave alignment surface that defines an optical axis that is coincident with that defined by said active surface of said second reflector; and

defined by the tertiary reflector, a third planar alignment surface that is perpendicular to the optical axis defined by at least one of the active surface of the first and second reflectors, and a third concave alignment surface that defines an optical axis that is coincident with that defined by at least one of the active surface of the first and second reflectors.

14. The apparatus of claim 1 wherein the apparatus is a telescope.

15. A method for aligning a first and a second reflector with one another comprising:

adjusting tip and tilt of a first reflector so that a first planar alignment surface defined by the first reflector is perpendicular to an optical axis and to a first alignment beam;

positioning a retro-reflector along the optical axis;

adjusting the retro-reflector along the optical axis relative to the first reflector;

disposing a second reflector spaced from the first reflector such that an active surface of the second reflector faces an active surface of the first reflector;

adjusting tip and tilt of a second reflector so that a second planar alignment surface of the second reflector is perpendicular to the optical axis;

adjusting one of the first and second reflectors relative to the other of the first and second reflectors such that their optical axes are coincident and the reflectors are spaced from one another.

16. The method of claim 15 wherein adjusting the retro-reflector along the optical axis relative to the first reflector comprises positioning the retro-reflector coincident with a focus defined by a first concave alignment surface defined by the first reflector.

17. The method of claim 15 wherein adjusting one of the first and second reflectors comprises positioning the second reflector such that a focus defined by a second concave alignment surface defined by the second reflector is co-located with said retro-reflector.

18. The method of claim 15 further comprising providing a performance check beam to impact, in order, the active surface of the first reflector, the active surface of the second

reflector, at least one additional reflective surface, the active surface of the second reflector, and the concave surface of the first reflector.

19. The method of claim 15 wherein an interferometer is used for at least one of: adjusting tip and tilt of the first reflector, adjusting the retro-reflector, adjusting tip and tilt of the second reflector, and adjusting at least one of the first and second reflectors relative to the other.

20. A method of displaying alignment of a first reflector relative to a second reflector in five degrees of freedom simultaneously, comprising:

providing a performance check beam parallel to an optical axis defined by a first and second reflector;

reflecting the performance check beam from, in order, a first point on an active concave surface defined by the first reflector, a second point on an active surface of the second reflector that faces the concave surface, at least a third point on an additional reflective surface, a fourth point on the active surface of the second reflector, and a fifth point on the active concave surface;

interfering a beam reflected from the fifth point with a reference beam to display relative alignment of the reflectors.